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Brazil

Agricultural Situation

The CO2 Market in Brazil 2007

Approved by:

Morgan Perkins, Director
U.S.AGRICULTURAL TRADE OFFICER

Prepared by:

Fabiana Fonseca, Agricultural Marketing Specialist

Report Highlights:

This report gives an overview of the process by which Brazil's sugar and ethanol producers are able to generate revenue via the sale of carbon credits. While still in its infancy, development of this market promises to provide industry with a new source of revenue while requiring little additional investment.

Includes PSD Changes: No
Includes Trade Matrix: No
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I. Introduction

The debate on the causes of global warming gained political attention in 1992 when the United Nations created the United Nations Framework Convention on Climate Change (UNFCCC). Five years later, in 1997, during the Conference of the Parties (COP) held in Kyoto, Japan, the so-called Kyoto Protocol was formalized. The essence of this international treaty is that most industrialized countries (included in ANNEX I to the protocol) agree to decrease greenhouse-gas emissions¹, [measured as the equivalent in carbon dioxide, (CO₂) emissions], by 5.2 percent below 1990 levels during the first stage of the protocol, from 2008 to 2012. At the same time, developing and least developed countries, the non-ANNEX I nations (including Brazil), must release emission reports, develop mitigation programs, protect carbon assets and cooperate to the technical and scientific development of emission-reduction.

The Kyoto Protocol came into effect in 2005 and as of September 28, 2006 had been ratified by 166 countries. To turn this agreement into action, 3 mechanisms were created: *Joint Implementation*, *Emissions Trading* (neither apply to developing countries) and the *Clean Development Mechanism*. Through this third mechanism, industrialized countries are able to meet their emission targets via emissions reductions or by sponsoring reduction projects in developing countries. In addition, the non-ANNEX I countries are able to negotiate with ANNEX I countries Certified Emission Reductions (CERs) for abating or sequestering greenhouse gases from the atmosphere. The concept of this instrument is to promote sustainable growth in developing countries and simultaneously offset emissions in developed countries.

As of end-2006, 138 projects were being developed in Brazil under the CDM, 58 percent had already received approval from the CDM Executive Board to proceed with implementation. More than half of Brazilian projects are related to generation and co-generation of energy, while agricultural concerns (co-generation) account for approximately 19 percent.

II. General guidelines to become eligible to sell carbon credits

Implementation of the Clean Development Mechanism (CDM) is overseen by the Clean Development Mechanism Executive Board, which is designated by the Conference of the Parties (COP), the supreme body of the UNFCCC. Prior to being eligible to negotiate CERs, interested parties are required to develop a project which must "be approved by all involved parties, demonstrating a measurable and long-term ability to reduce emissions, and promise reductions that would be additional to any that would otherwise occur" (UNFCCC, 1998). In other words, eligible projects must lead directly to a reduction in emissions or replace another technology that would lead to higher emissions levels.

Projects currently accepted under the CDM are related to:

- a) Energy (renewable and non-renewable sources)
 - Generation of energy through renewable sources
 - Generation of energy via increases in efficiency
 - Generation of energy through capturing and use of landfill gases
 - Fossil fuel replacement
- b) Industrial processes

¹ Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF₆)

- Mineral products
- Chemical industry
- Metal production
- Other production
- Production of halocarbons and sulphur hexafluoride
- Consumption of halocarbons and sulphur hexafluoride
- Other

c) Solvent and other product use

d) Agriculture

- Enteric fermentation
- Manure management
- Rice cultivation
- Agricultural soils
- Prescribed burning of savannas
- Field burning of agricultural residues
- Other

e) Waste

- Solid waste disposal and land
- Wastewater handling
- Waste incineration
- Other

Projects must go through seven phases:

Phase I: Development of the Project Design Document (PDD)

During the first phase the PDD must be completed according to CDM approved methodology. In brief, the project must include: description of proposed project; identification of involved parties; methodology; model used to estimate greenhouse gases emissions; monitoring plan; definition of the crediting period; justification for additionality; environment impact, comments of stakeholders and information on financing sources.

Phase II: Validation of PDD by the Designated Operational Entity (DOE)

The second phase occurs in country when the DOE, which can be either a domestic legal entity or an international organization, conducts an independent evaluation to make sure the project follows CDM requirements. Prior to submitting the project to the Executive Board for registration, phase three takes place.

Phase III: Approval of PDD by the Designated National Authority (DNA)

At the third stage the DNAs of the countries participating in the project confirm their voluntary involvement. Concomitantly, the local DNA confirms that the project helps the achievement of sustainable development. Brazil's national authority is the Interministerial Commission for Global Climate Change (CIMGC). Representatives of the following government agencies compose the CIMGC: Ministry of External Relations; Ministry of Transport; Ministry for Environment; Ministry of Science and Technology; Ministry of Development, Industry and Commerce; Ministry of Agriculture, Livestock and Food Supply, Ministry of Energy; and, Ministry of Planning, Budget and Management.

Phase IV: Registration confirmed by the Executive Board

At phase four, the Executive Board, located in Bonn, Germany, receives the project, conducts and concludes its review. After that the project activity will be registered.

Phase V: Monitoring process implemented by project participants

The monitoring stage occurs during phase five and is conducted by the project participants who are also responsible for filing relevant data for calculation of reduction of greenhouse emission. The calculation must follow the methodology established in the PDD, its boundaries and its crediting period.

Phase VI: Verification/certification of the emission reductions

Verification is an independent auditing process applied periodically to review the estimates for reduction of greenhouse gases emission as a result of the CDM project. If the reductions were achieved during the specified period and activity, the Executive Board certifies that the project has achieved the reduction target as stated on the project.

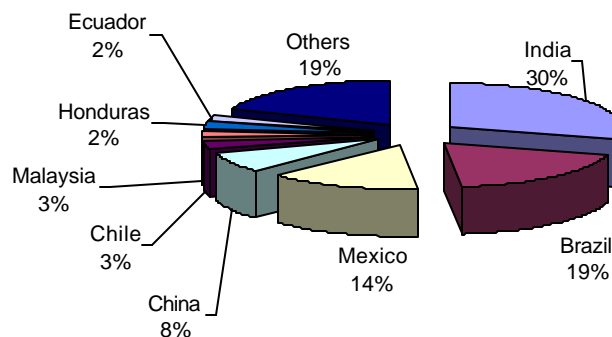
Phase VII: Issuance of CERs related to the project activity

The project achieves its final stage in phase seven, when the Executive Board authorizes the issuance of CERs. Each participant specified on the PDD will receive the credits in accordance with registered criteria. A CER amounts to 1 tone of carbon dioxide equivalent (CO₂e).

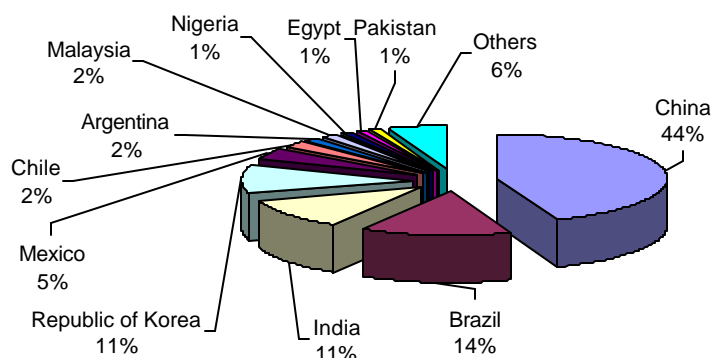
III. Clean Development Mechanism (CDM) projects in course

According to UNFCCC data, by November 11th, 2006 approximately 1,300 projects had entered the process for CDM approval. From this total, the Executive Board already registered 421 projects and 56 were in the process of requesting registration (Phase IV). The share of CDM registered projects and CERs expected to be issued, by country, follows:

CDM REGISTERED PROJECTS BY COUNTRY



Source: UNFCCC

EXPECTED AVERAGE ANNUAL CERs FROM REGISTERED PROJECTS BY COUNTRY

Source: UNFCCC

Note: Projects are based on 7 to 10 years period.

The table below details the forecast elaborated by UNFCCC for the first period of commitment (generally the first 1-year after registration):

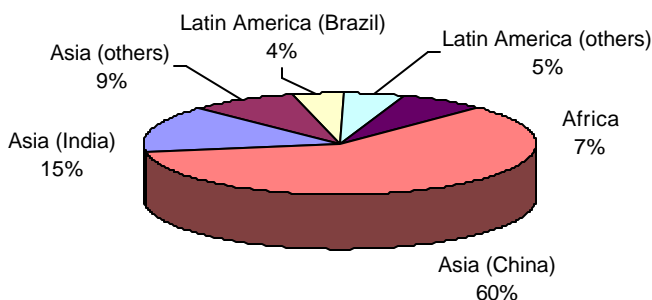
Status of CDM projects	# of PDDs	Annual Average CERs*	Expected CERs until end of 2012**
Registered	421	104,121,494	>680,000,000
Requesting registration	56	4,773,727	>20,000,000
In approval process	~823	N/A	~800,000,000
TOTAL	>1,300	N/A	~1,500,000,000

Note: * assuming all activities deliver simultaneously their expected annual average emission

**assuming there will be no renewal of crediting periods

Source: UNFCCC

The World Bank's data shows that through the end of September 2006 the leading region on issuance of CERs was Asia, followed by Latin America and Africa. During this period Asia was responsible for 84 percent of total CDM credits negotiated, with China and India accounting for 60 percent and 15 percent of the total market share, respectively. Latin America accounted for 9 percent of total CERs supplied. Brazil by itself generated 4 percent of the total while African and other Asian countries, in that order, produced 7 percent and 9 percent of the credits. Despite the gap between expected results released by the UNFCCC and the World Bank research, it is clear that China, India and Brazil are emerging as the primary sources of CERs.

SHARE OF CDM CREDITS ISSUED BY COUNTRY
(until September 2006)

Source: World Bank

IV. The most relevant barriers to entry the carbon market

As indicated by market analysts, the major barriers related to the issuance of CERs involve:

- Uncertainties regarding CDM regulation framework
- Bureaucracy for approving CDM projects and critical lack of information to run CDM's projects under the strict verification process
- Proving additionality appears to be a huge barrier, demonstrating that the project would not be implemented without the carbon credit is a burden.
- Heavy transaction fees (US\$40,000- US\$75,000) turns impracticable the development of mid-size projects
- Credits originated from CDM projects involve higher risks, as they are the outcome of a designed project, subject to a set of regulations and procedures in addition to implementation risks.
- The diversity of projects being created and the number of players applying under CDM projects are increasing significantly; therefore transactions are becoming more complex to operate along time.
- Confidentiality and lack of transparency of prices and contracts does not help to build up the market structure
- Uncertainties regarding long term prices of CERs
- Business climate after 1st period commitment

V. Market trading structure

According to the World Bank's report "State and Trends of the Carbon Market 2006", during the first three quarters of 2006 the carbon market generated an estimated in US\$21.5 billion². This figure represents a 94 percent increase compared to all of 2005. The volume of carbon dioxide equivalent (CO_{2e}) emission reduction transacted also rose, from 716.6 MtCO₂ to 1,022.4 MtCO₂. Although European Union Emissions Trading Scheme (EU ETS) – a cap and trade system under which EU member states define their maximum emission limits and under a market based policy are able to sell or purchase allowances – accounts for approximately 88 percent of the total value of the market. Meanwhile, CDM project business represented US\$2.4 billion or approximately 11 percent of the total CO_{2e} negotiated through the third quarter of 2006.

To help companies register greenhouse gas emissions reduction and trading operations several Emission Trading Schemes were created around the world, either following the Kyoto Protocol or as a voluntary program. Compared to allowances, project-based credits generate 15 percent less income due to transaction costs. Average nominal prices oscillate around US\$10.35 to US\$11.10 for emission unit until the third quarter of 2006. Currently the following schemes are in place:

- European Union Emissions Trading Scheme (EU ETS)
- Chicago Climate Exchange (CCX)
- New South Wales Greenhouse Gas Abatement Scheme (NSW)

² Based on transactions registered on the European Union Emissions Trading Scheme (EU ETS), the Chicago Climate Exchange (CCX), the New South Wales Greenhouse Gas Abatement Scheme (NSW) and the United Kingdom Emissions Trading Scheme (UK ETS).

- United Kingdom Emissions Trading Scheme (UK ETS)
- Canadian Emission Trading Scheme
- California Climate Action Registry (the Registry)
- Japanese Voluntary Emissions Trading Scheme (JVETS)

There is no established mechanism such as a stock exchange for trading CERs in Brazil. CERs are mainly negotiated over-the-counter, through bilateral agreements. The top 3 companies acting as intermediaries between carbon credit sellers and buyers are EcoSecurities, MaxAmbiental and EcoEnergy. However, in September 2005, the Brazilian Mercantile & Futures Exchange (BM&F) created a division called BM&F Carbon Facility which functions as a platform where sellers are able to register CDMs projects and buyers may register their purchase intentions, or Expression of Interest (EOI). In the near future, this mechanism is also intended to function as a reference system. Stakeholders will be able to follow the implementation process since the status of each stage of a CDM project will be available on-line. According to BM&F, this scheme will give more transparency to operations by minimizing risks and transaction costs. The initiative is part of a larger project sponsored by BM&F and the Ministry of Development, Industry and Commerce for developing a formal trading system, the Brazilian Emissions Reduction Market (MBRE).

VI. Brazil case study

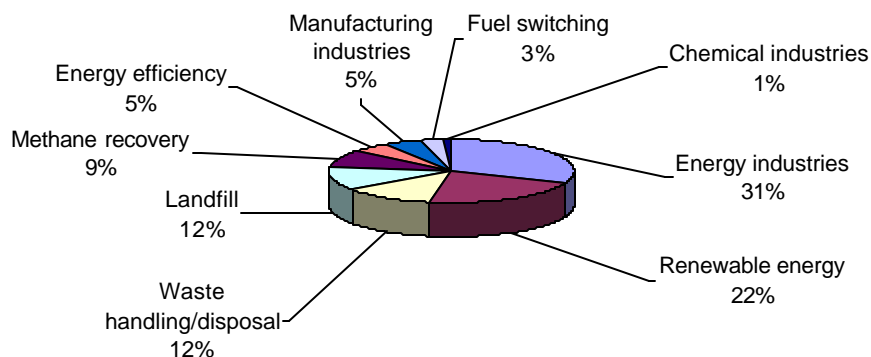
The Inter-ministerial Commission on Global Climate Change was instituted by the Presidential Decree of July 7th, 1999 – altered on July 10th, 2006 - to function as the Brazilian DNA and to articulate actions required by the Kyoto Protocol. Through this decree the Ministry of Science and Technology (MCT) holds the Commission's presidency and functions as the Executive Secretariat while the Ministry of Environment holds the vice-presidency. Under the coordination of MCT a multi-institution team coordinates the Brazilian Communication Agency, which involves 2 major areas: 1) the inventory of greenhouse gas emissions generated by the energy sector, industry, forestry and land use, agriculture and livestock and waste treatment; and, 2) the general description of steps taken or envisioned for the implementation of the UNFCCC guidelines in-country

The additional legislation structuring actions on climate change issues in Brazil are:

- Resolution n°1, September 11th, 2003
- Resolution n°2, August 10th, 2005
- Resolution n°3, March 24th, 2006
- Resolution n°4, December 6th, 2006

The MCT affirms that CO₂ emissions reduction is the goal of 64 percent of total CDM projects in Brazil, while reduced emissions of methane (CH₄) and nitrous oxide (N₂O) account for 35 percent and 1 percent, respectively. Well over half of the Brazilian CDM projects focus the energy sector showing the relevance of such projects in attracting foreign capital. Data released by the MCT indicates that 54 percent these projects are focused specifically on electric generation or co-generation from biomass. Following the methodology set up under the Protocol, CDM projects are classified into 2 categories: small and large size. Projects implemented in Brazil tend to be large ones; 61 percent of total projects fall under such category.

SHARE OF PROJECTS BY TYPE



Source: MCT

To date there are 138 Brazilian projects under validation/approval by the DNA and 80 approved by the UNFCCC Executive Board. From the total number of projects approved by the Executive Board, 31 involve electric co-generation from biomass (almost exclusively sugarcane bagasse). Units of CERs issued as a result of these projects totaled 2,167,316 CERs through the end of 2006. Foreign investments on these projects comes mainly from Europe (Sweden, Netherlands, France and UK), however, Japan inflows have also increased. The projects are:

- Electric power co-generation by LDG recovery (CST Brazil)
- Usina Itamarati co-generation project*
- Southeast Caete Mills bagasse co-generation project (SECMBCP)*
- Serra bagasse co-generation project*
- Coruripe bagasse co-generation project (CBCP)*
- Alto Alegre bagasse co-generation project (AABCP)*
- Equipav bagasse co-generation project (EBCP)
- Coimbra-Cresciumal bagasse co-generation project (CCBCP)
- Zilo Lorenzetti bagasse co-generation project (ZLBCP)*
- Central Energetica do Rio Pardo co-generation project (CERPA)
- Campo Florido bagasse co-generation project (CFBCP)*
- Iturama bagasse co-generation project (IBCP)
- Santa Elisa bagasse co-generation project (SEBCP)
- Vale do Rosario bagasse co-generation (VRBC)*
- Moema bagasse co-generation project (MBCP)*
- Alta Mogiana bagasse co-generation project (AMBCP)*
- Cerradinho bagasse co-generation project (CBCP)*
- Nova America bagasse co-generation project (NABCP)*
- Lucelia bagasse co-generation project (LBCP)*
- Santa Candida bagasse co-generation project (SCBCP)*
- Jalles Machado bagasse co-generation project (JMBBCP)*
- Colombo bagasse co-generation project (CBCP)*
- Cruz Alta bagasse co-generation project (CABCP)
- Bunge Guara Biomass Project
- Irani biomass electricity generation project
- Cucau bagasse co-generation project (CBCP)*
- Koblitz Pirani Energia SA biomass power plant
- Camil Itaquí biomass electricity generation project

- Precious Wood Energia Itacoatiara project
- Inacio Martins biomass project
- Rickli biomass electricity generation project

* Projects linked directly to sugar mills

Analysts indicate that there is increasing investor interest in the Brazilian “agro-energy” sector; primarily in ethanol production, but also in co-generation from bagasse. A recent estimate released by the Ministry of Agriculture, Livestock and Food Supply (MAPA) shows that foreign direct investment (FDI) in Brazilian agribusiness increased significantly. In 1996 it amounted to only US\$568 million dollars, representing 6 percent of Brazil’s total FDI, while in 2006 agribusiness captured US\$ 3.5 billion or 16 percent of total FDI. As indicated by MAPA, this amount does not include investment from trust funds, and may underestimate the total.

Consultants believe that in the near future Brazilian sugar cane and alcohol mills will become more engaged with carbon credit operations. This market is still quite new to most sugar and ethanol producers, but participation is expected to expand as it offers a new mechanism for increasing revenues. Required investments to comply with CDM requirements are marginal if made as part of normally scheduled replacement or improvement of boilers; any additional expenditures are primarily for project design, auditing and administrative costs. The Sao Paulo Sugarcane Agroindustry Union (UNICA) states that 100 percent of sugar and alcohol millers are self-sufficient in co-generation and 10 percent already trade surplus energy.

For sugar mills, calculated reductions in carbon emissions are based not on total energy production, but on the quantity of energy sold to distribution concessionaires. Revenues generated by CERs transactions are low when compared to total turnover of a sugar mill (estimated by contacts at less than 0.5 percent of total revenue), but this income represents almost pure profit.

To forecast revenues generated by sugar cane mills, the consultant company Key Associados, makes the following estimate: A mill processing 2.5 million metric tons of sugarcane annually, would generate 40 thousand megawatts/year during 160 days/year, 24 hours a day. Under these conditions, this mill is able to negotiate 15 thousand tons of CO₂ credits per year, worth approximately R\$ 400,000 (US \$192,000 at the current exchange rate of R\$ 2.08/dollar), or 0.2% of that mill's total estimated turnover of R\$ 200 million.